

WO 03/014653

PCT/AU02/01076

12

CLAIMS:

1. A shaped charge and projectile combination including:
a projectile
- 5 a shaped charge of high explosive material including a cavity in an external face of the charge, shaped to axially concentrate explosive upon detonation of the shaped charge towards the projectile, and
a metal liner between the shaped charge and the projectile, to form a jet of liner material on detonation of the shaped charge to impact the rear of and propel the
10 projectile.
2. A shaped charge and projectile combination as claimed in claim 1 wherein the shaped charge is housed in a casing forming a cartridge.
- 15 3. A shaped charge and projectile combination as claimed in claim 2 wherein the projectile is retained within the cavity in the shaped charge.
4. A shaped charge and projectile combination as claimed in any one of claims 1 to 3 wherein the projectile has a ballistic shape with a front end and a rear end and wherein
20 at least the rear end includes a layer of temperature resistant material.
5. A shaped charge and projectile combination as claimed in claim 4 wherein the temperature resistant material is one of the group of carbon, titanium, tungsten, ceramics, steel, uranium or depleted uranium.
25
6. A shaped charge and projectile combination as claimed in any one of claims 1 to 5 wherein the projectile includes an aperture facing the liner of the shaped charge.
7. A shaped charge and projectile combination as claimed in any one of claims 1 to
30 6 wherein the projectile includes stabilisation means.

WO 03/014653

PCT/AU02/01076

13

8. A shaped charge and projectile in combination as claimed in claim 7 wherein the stabilisation means includes external wings or fins.
9. A shaped charge and projectile in combination as claimed in claim 7 wherein the stabilisation means includes dimples or grooves.
10. A shaped charge and projectile in combination as claimed in claim 7 wherein the stabilisation means includes means to interact with rifling on the inside of a barrel of a weapon.
11. A shaped charge and projectile combination as claimed in any one of claims 1 to 10 wherein the projectile is a bullet.
12. A shaped charge and projectile combination as claimed in any one of claims 1 to 10 wherein the projectile is a shell.
13. A shaped charge and projectile combination as claimed in any one of claims 1 to 12 wherein the cavity in the shaped charge has a concave shape.
14. A shaped charge and projectile combination as claimed in any one of claims 1 to 12 wherein the cavity in the shaped charge has an ovaloid shape.
15. A shaped charge and projectile combination as claimed in any one of claims 1 to 12 wherein the cavity in the shaped charge has a cylindrical shape.
16. A shaped charge and projectile combination as claimed in any one of claims 1 to 15 wherein the explosive of the shaped charge is arranged to be detonated by electrical ignition.
17. A shaped charge and projectile in combination as claimed in any one of claims 1 to 15 wherein the explosive of the shaped charge is arranged to be detonated by a firing pin.

WO 03/014653

PCT/AT02/01076

14

18. A shaped charge and projectile in combination as claimed in any one of claims 1 to 15 wherein the explosive of the shaped charge is arranged to be detonated by laser ignition.

5 19. A shaped charge and projectile in combination as claimed in any one of the preceding claims wherein the projectile has a diameter which is less than the widest cross-section of the cavity in the shaped charge.

10 20. A shaped charge and projectile in combination as claimed in any one of the preceding claims wherein the liner is a ballistic disk.

21. A shaped charge and projectile in combination including:
a projectile,
a body of a high explosive material forming a charge and including an internal
15 cavity open to one end of the charge to axially concentrate explosive force upon detonation of the shaped charge towards the rear face of the projectile, and
a metal layer lining the interior of the cavity in the shaped charge.

20 22. A shaped charge and projectile combination as claimed in claim 21 wherein the shaped charge is housed in a casing forming a cartridge.

23. A shaped charge and projectile combination as claimed in claim 22 wherein the projectile is retained within the cavity in the shaped charge.

25 24. A shaped charge and projectile combination as claimed in any one of claims 21 to 23 wherein the projectile has a ballistic shape with a front end and a rear end and wherein at least the rear end includes a layer of temperature resistant material.

30 25. A shaped charge and projectile combination as claimed in claim 24 wherein the temperature resistant material is one of the group of carbon, titanium, tungsten, ceramics, steel, uranium or depleted uranium.

WO 03/014653

PCT/AU02/01076

15

26. A shaped charge and projectile combination as claimed in any one of claims 21 to 25 wherein the projectile includes an aperture facing the liner of the shaped charge.
27. A shaped charge and projectile combination as claimed in any one of claims 21 to 26 wherein the projectile includes stabilisation means.
28. A shaped charge and projectile in combination as claimed in claim 27 wherein the stabilisation means includes external wings or fins.
29. A shaped charge and projectile in combination as claimed in claim 27 wherein the stabilisation means includes dimples or grooves.
30. A shaped charge and projectile in combination as claimed in claim 27 wherein the stabilisation means includes means to interact with rifling on the inside of a barrel of a weapon.
31. A shaped charge and projectile combination as claimed in any one of claims 21 to 30 wherein the projectile is a bullet.
32. A shaped charge and projectile combination as claimed in any one of claims 21 to 30 wherein the projectile is a shell.
33. A shaped charge and projectile combination as claimed in any one of claims 21 to 32 wherein the cavity in the shaped charge has a concave shape.
34. A shaped charge and projectile combination as claimed in any one of claims 21 to 32 wherein the cavity in the shaped charge has an ovaloid shape.
35. A shaped charge and projectile combination as claimed in any one of claims 21 to 32 wherein the cavity in the shaped charge has a cylindrical shape.

WO 03/014653

PCT/AU02/01076

16

36. A shaped charge and projectile combination as claimed in any one of claims 21 to 35 wherein the explosive of the shaped charge is arranged to be detonated by electrical ignition.

5 37. A shaped charge and projectile in combination as claimed in any one of claims 21 to 35 wherein the explosive of the shaped charge is arranged to be detonated by a firing pin.

10 38. A shaped charge and projectile in combination as claimed in any one of claims 21 to 35 wherein the explosive of the shaped charge is arranged to be detonated by laser ignition.

15 39. A shaped charge and projectile in combination as claimed in any one of claims 21 to 38 wherein the projectile has a diameter which is less than the widest cross-section of the cavity in the shaped charge.

40. A shaped charge and projectile in combination as claimed in any one of claims 21 to 39 wherein the liner is a ballistic disk.

20 41. A method of propelling a projectile including:
providing a projectile,
providing a shaped charge of high explosive material including a cavity in an external face of the charge, the cavity shaped to axially concentrate explosive upon detonation of the shaped charge towards the projectile,
25 providing a metal liner between the shaped charge and the projectile, and
detonating the shaped charge at an end opposite the cavity to form a jet of liner material, and focus the jet on the rear of the projectile so that at least a portion of the kinetic energy of the jet is transferred to the projectile to propel the projectile.

30